The Magic of the OPC Unified Architecture

The OPC Foundation is nearing completion of the first phase of its new Unified Architecture (UA). The new Unified Architecture is meant to tie together/unify all of the existing OPC technology. OPC vendors are already undergoing the designand implementation phase of their products incorporating the OPC Unified Architecture technology. The strategy that vendors will take with respect to the OPC Unified Architecture is highlighted below.

Open Standards-Not Just Microsoft Anymore

An obvious change that users will notice right away is that OPC-UA is not based on Microsoft COM/DCOM. The whole world, including Microsoft, is embracing open, internet based communication standards. Naturally, OPC has done the same basing UA on TCP/IP, HTTP, SOAP, and XML. Not being tied only to Microsoft platforms makes OPC-UA highly scalable. Expect to see OPC-UA implemented in embedded field devices on up to Unix or mainframe based enterprise applications.

"Unified" Blurs The Distinction Between DA, HDA A&E

Existing OPC applications are largely broken down on functional lines, based on which of the OPC Specifications are supported (Data Access, Historical Data Access or Alarms & Events). Clients and Servers based on the Unified Architecture will blur this distinction, since the transfer of all data, no matter its type or purpose, is transferred using the same base UA services. Couple this with the first-class support of complex data (arrays, binary structures, XML documents etc.) and you will see server vendors expose data with complete fidelity as it naturally exists in the system rather than exposing only a subset of data forced into a OPC defined data format is done today. Some pioneering, forward thinking vendors will realize with this capability, there will no longer be the need for any proprietary vendor defined interfaces and they will only expose the data via UA.

Enterprise Data Worthy

The OPC Foundation has been working with other standards organizations to gear UA as a premier vehicle for conveying and transporting data defined by these other specifications. With the acceptance of UML based models and XML Schema to define and render complex data, many information model specifications are emerging. Some of the organizations OPC is working directly with include:

- ISA S95 and S88
- MIMOSA
- EDDL
- OAGi
- IEC TC57

Expect to see companion specifications emerge that bind the data models described by these and other specifications to OPC-UA, thus providing for complete information level interoperability from one application to another. Note also that applications that utilize this type of data are not the typical factory floor applications that traditionally implement

OPC today. Instead they are enterprise applications at the MES and ERP level. Expect to see OPC-UA implemented in applications far outside the scope of current day OPC apps.

The Three R's (Robustness, Reliability, Redundancy)

Rather than live at the mercy of the underlying internet protocols, the OPC Unified Architecture takes direct responsibility for, and builds in, all of the necessary failure detection and recovery logic making UA viable for mission critical communication. Beyond robustness and reliability, several redundancy schemes are defined so that vendors may provide this capability in a standard way. Expect to see OPC-UA used as the "native" communication method by applications, usurping proprietary vendor protocols and possibly some existing fieldbus protocols.

Enhanced Certification

Existing OPC applications vary greatly in their compatibility and interoperability with other OPC applications. Although OPC is currently stressing the need for products to be both certified and tested at interoperability workshops, the reality is only a small percentage of the OPC products on the market meet that mark. With the Unified Architecture, the certification tests cover both servers and clients and will be administered by sanctioned testing labs. These tests are expected to be available in time to test the very first UA products on the market. Via electronic certificates issued by OPC, the certification status of any UA component will be available in real time directly though the UA interface. Expect to see most if not all OPC-UA applications properly certified thus greatly increasing the likelihood of true plug-n-play. (Feel free to refuse to purchase any UA products that are not properly certified.)

Backward Compatibility Ensures Quick Adoption

The OPC Foundation is providing its members several code based deliverables to simplify vendor development and aid with backward compatibility. First, the OPC-UA API provides much of the plumbing and low level generic serialization and wire support so that vendors need only code the high level aspects UA into their applications. The API is expected to be available in several languages supporting multiple popular computing platforms. In addition to the API, the OPC Foundation is also providing its members shippable binary adapter modules which allow new OPC-UA clients direct access to all of the legacy COM based OPC Servers, and legacy COM based OPC Clients access to a subset of the features of new OPC-UA Servers. The two adapters can even be used together to connect a legacy client to a legacy server, replacing the standard DCOM communication with the new OPC-UA internet-based protocols. Expect to see vendors quickly support OPC-UA in all of their new applications. With complete backward compatibility insured, vendors will have much to gain and nothing to loose by adopting the new OPC Unified Architecture.